

## CLAIMS

1. A photocatalyst module comprising a substrate, a photocatalyst, and a protective layer containing lithium silicate provided between the substrate and the photocatalyst.
- 5 2. The photocatalyst module according to claim 1 wherein said protective layer containing lithium silicate is a film obtained by applying a paint prepared from a vehicle containing 80 to 90 % by weight of lithium silicate and 10 to 20 % by weight of sodium silicate on the surface of said
- 10 substrate.
3. The photocatalyst module according to claim 2 wherein said vehicle further contains 0.1 to 10 % by weight of a resin emulsion which is not gelatinized under an alkaline condition of a pH of 11 to 12.
- 15 4. The photocatalyst module according to any one of claims 1 to 3 wherein said photocatalyst is titanium oxide.
5. The photocatalyst module according to any one of claims 1 to 4 wherein said photocatalyst is in a shape of a layer of particles.
- 20 6. A process for producing a photocatalyst module having a layer of a photocatalyst on the surface thereof comprising forming a film containing lithium silicate on a substrate and then forming the layer of a photocatalyst on the surface of the film.
- 25 7. The process for producing a photocatalyst module according to claim 6 wherein said film containing lithium silicate is formed by applying a paint prepared from a

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vehicle containing 80 to 90 % by weight of lithium silicate and 10 to 20 % by weight of sodium silicate on the surface of said substrate.

8. The process for producing a photocatalyst module  
5 according to claim 7 wherein said vehicle further contains 0.1 to 10 % by weight of a resin emulsion which is not gelatinized under an alkaline condition of a pH of 11 to 12.

Sub A2 9. The process for producing a photocatalyst module  
10 according to any one of claims 6 to 8 wherein the molar ratio of lithium oxide ( $\text{Li}_2\text{O}$ ) to silicon dioxide ( $\text{SiO}_2$ ) (lithium oxide : silicon dioxide) in the lithium silicate is 1:3.

10. The process for producing a photocatalyst module  
15 according to any one of claims 6 to 9 wherein the formation of said layer of a photocatalyst is carried out by a flame spray coating method.

11. A photocatalyst reaction apparatus provided with a photocatalyst module defined in any one of claims 1 to 5.

12. A photocatalyst reaction apparatus comprising a water  
20 tank provided with a photocatalyst module defined in any one of claims 1 to 5, water introducing means, water discharging means, and means for radiating ultraviolet rays.

13. A photocatalyst reaction apparatus comprising a water  
25 tank on at least a part of the inner wall surface of which tank a photocatalyst is provided through a protective layer containing lithium silicate, the water tank further having means for introducing water to be treated, means for

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discharging the treated water, and means for radiating ultraviolet rays each provided at or in the water tank.

14. The photocatalyst reaction apparatus according to claim 13 wherein said apparatus comprises at least two water

5 tanks connected in series, the means for radiating ultraviolet rays provided in a first water tank is means for radiating ultraviolet rays of a medium wavelength of 170 to 260 nm, and the means for radiating ultraviolet rays provided in a second water tank is means for radiating ultraviolet

10 rays of a long wavelength of 310 to 370 nm.

15. The photocatalyst reaction apparatus according to claim 14 wherein said apparatus further comprises a tank used for mixing ozone formed by radiating ultraviolet rays of a short wavelength of 183 to 184 nm to air with water to be

15 treated and placed at a position preceding said first water tank in the order of treatments.

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